

# **Saving the Indian River Lagoon and St Johns River Through Stormwater Rediversion**

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**St. Johns River**  
Water Management District

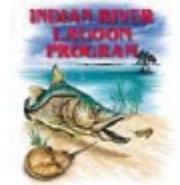
# Indian River Lagoon (IRL) TMDL/BMAP

- 2009 TMDL
- Central IRL:
  - 998,115 lb/yr TN reduction
  - 148,955 lb/yr TP reduction
- North and Banana River IRL:
  - ~200,000 lb/yr TN reduction



# Indian River Lagoon Feasibility Analysis

- Funded by FDEP
- Administered by SJRWMD
- Near-term projects
- Difficult to fund through conventional means
- High-benefit projects
- Primary benefits: IRL nutrient load reduction and freshwater inflow
- Secondary benefit: St. Johns River alternative water supply



## Indian River Lagoon Stormwater Capture and Treatment Feasibility Analysis



St. Johns River Water Management District | January 2017



**St. Johns River**  
Water Management District

**JonesEdmunds**

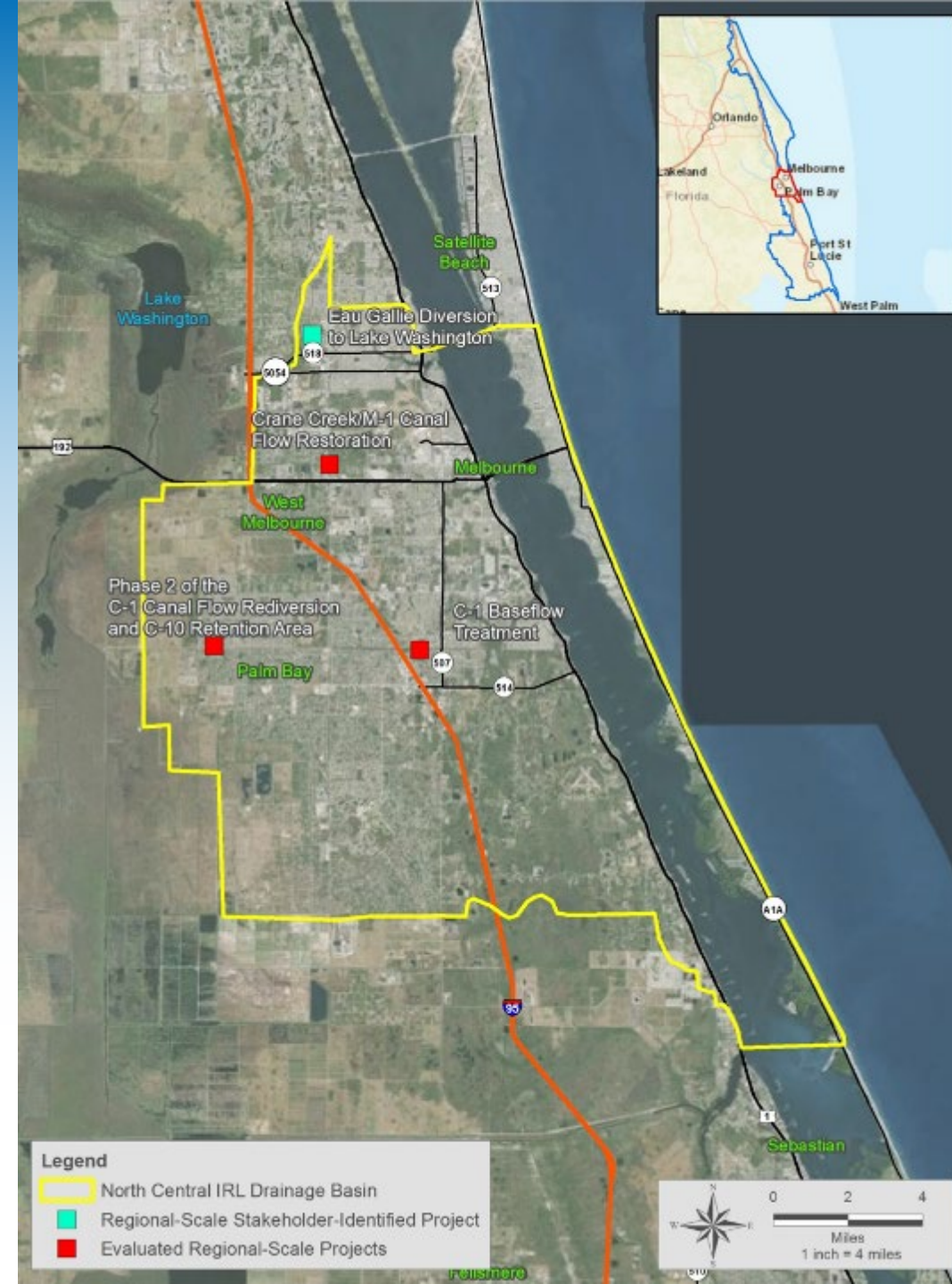
# Importance of Regional-Scale Projects

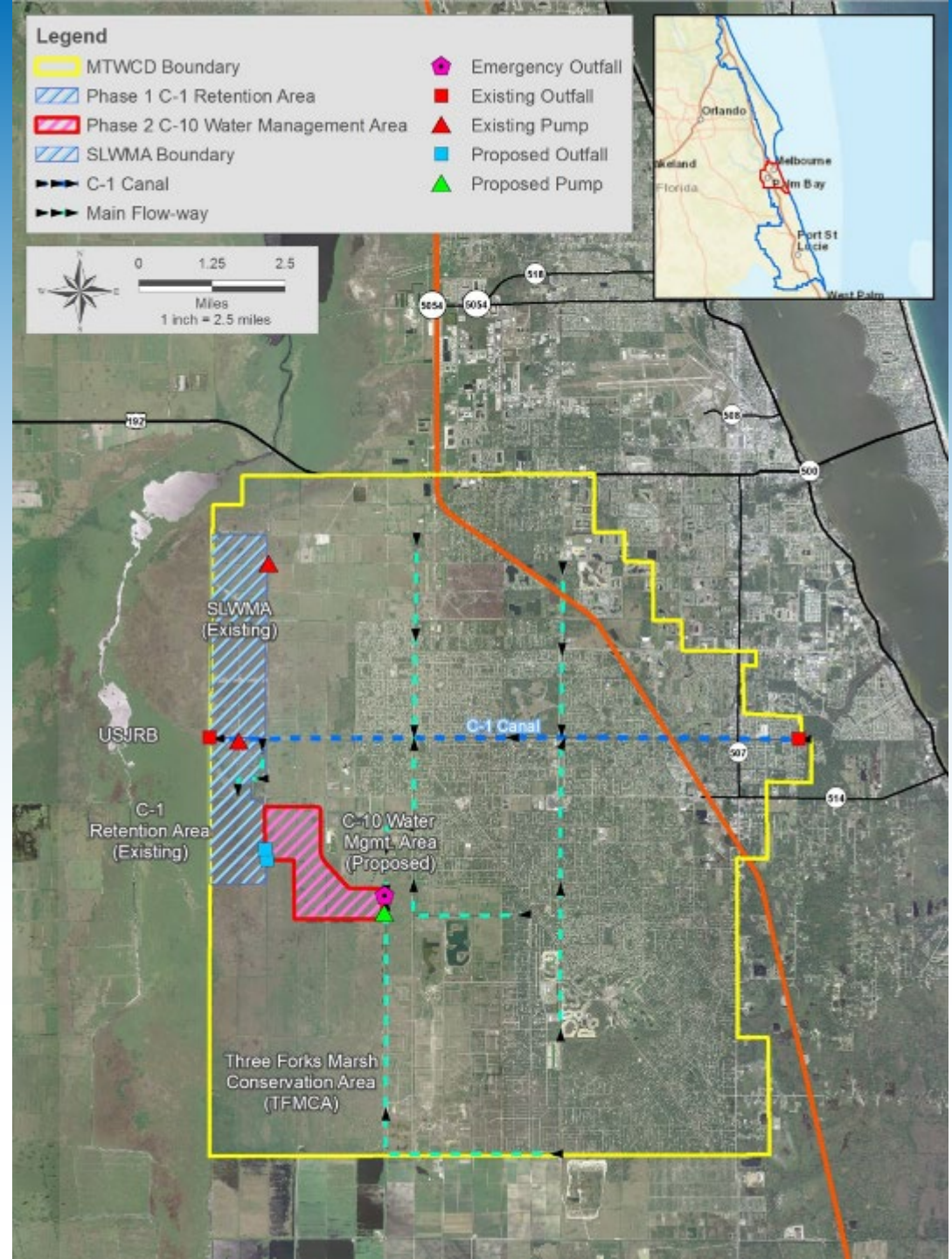
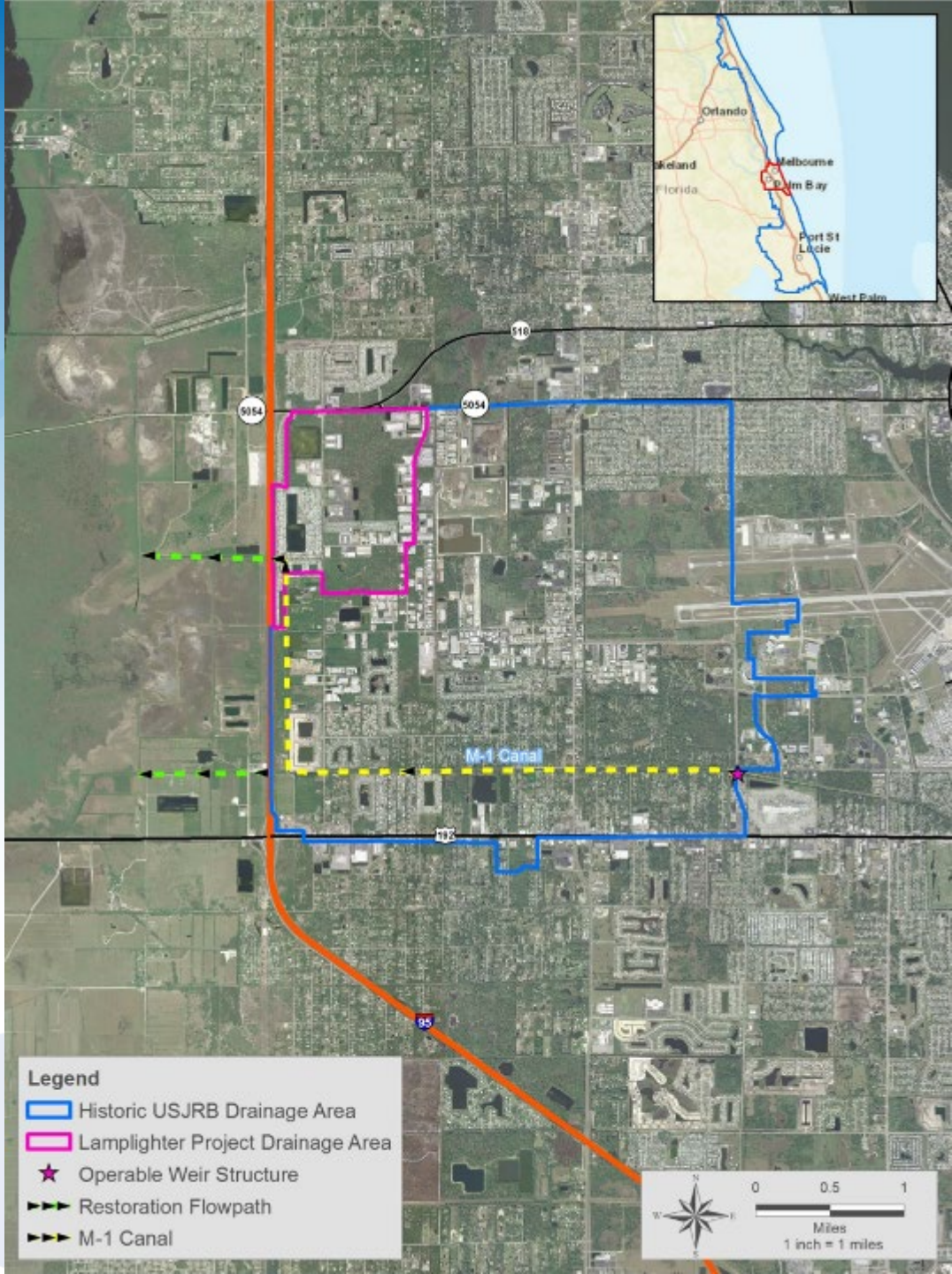
Type	Scale (Acres Treated)	Total Nitrogen Removal (lb/yr)	Typical Removal Costs (\$/lb)
 Local	10s	10s	>\$1,000
 Neighborhood	100s	100s	\$200-800
 Regional	1,000s	1,000s or more	\$10-80



# Indian River Lagoon Feasibility Analysis

- Central IRL
  - Crane Creek/M-1 Canal
  - C-1 Baseflow Treatment
  - Phase 2 of C-1 (C-10)





# Indian River Lagoon 2017 Feasibility Analysis

IRL Segment	Project Name		TN Reduction* (lb)	TP Reduction* (lb)	Flow Restoration/ Water Supply Benefit* (MGD)
South IRL	CERP IRL South		1,047,000	269,000	--
South IRL	City of Port St. Lucie Water Farming Project**		--	3,500	--
South Central IRL	SRID Treatment and Storage***	Alt 1	9,000	1,000	--
		Alt 2	33,000	4,000	--
		Alt 3	67,000	10,000	--
South Central IRL	C-54 and Fellsmere Canals Flow Restoration	Alt 1	124,000	15,000	37
		Alt 2	124,000	15,000	37
South Central IRL	Sottile Canal Flow Restoration	Alt 1	29,000	6,100	3.9
		Alt 2	29,000	6,100	3.9
North Central IRL	Crane Creek/M-1 Canal Flow Restoration	Alt 1	23,000	2,900	8.8
		Alt 2	23,000	2,900	8.8
North Central IRL	C-1 Canal Baseflow Treatment****	Alt 1	35,000	2,100	--
		Alt 2	13,000	1,200	--
North Central IRL	C-10 Water Management Area		29,300	1,300	7.9
Halifax River	Nova Canal Watershed Alternative Water Supply		33,000	5,000	12



# Indian River Lagoon 2017 Feasibility Analysis

IRL Segment	Project Name		Project Costs* (2016 Dollars)		
			Capital Cost	Annual O&M Cost	Annualized Project Costs
South IRL	CERP IRL South**		\$1.38B	7.2M	~\$60M
South IRL	City of Port St. Lucie Water Farming Project		\$7.4M – \$12.0M	\$0.3M – \$0.5M	\$0.7M – \$0.8M
South Central IRL	SRID Treatment and Storage	Alt 1	\$11.1M – \$23.7M	\$0.4M – \$0.6M	\$0.9M – \$1.4M
		Alt 2	\$16.9M – \$36.3M	\$0.6M – \$0.9M	\$1.3M – \$2.1M
		Alt 3	\$26.8M – \$57.3M	\$0.9M – \$1.2M	\$1.9M – \$3.2M
South Central IRL	C-54 and Fellsmere Canals Flow Restoration	Alt 1	\$19.2M – \$31.1M	\$1.6M – \$2.3M	\$2.5M – \$3.0M
		Alt 2	\$21.5M – \$34.7M	\$1.8M – \$2.6M	\$2.8M – \$3.4M
South Central IRL	Sottile Canal Flow Restoration	Alt 1	\$11.4M – \$18.5M	\$0.4M – \$0.6M	\$0.9M – \$1.1M
		Alt 2	\$5.6M – \$9.1M	\$0.5M – \$0.7M	\$0.8M – \$0.9M
North Central IRL	Crane Creek/M-1 Canal Flow Restoration	Alt 1	\$4.5M – \$7.4M	\$0.3M – \$0.4M	\$0.5M – \$0.6M
		Alt 2	\$3.5M – \$5.7M	\$0.3M – \$0.4M	\$0.5M – \$0.5M
North Central IRL	C-1 Canal Baseflow Treatment	Alt 1	\$16.0M	\$0.5M	\$1.17M
		Alt 2	\$9.4M – 15.3M	\$0.4M – \$0.5M	\$0.8M – \$1.0M
North Central IRL	C-10 Water Management Area		\$25.2M	\$0.9M – \$1.3M	\$1.8M – \$2.3M
Halifax River	Nova Canal Watershed Alternative Water Supply		\$22.1M – \$35.9M	\$1M – \$1.4M	\$1.9M – \$2.5M



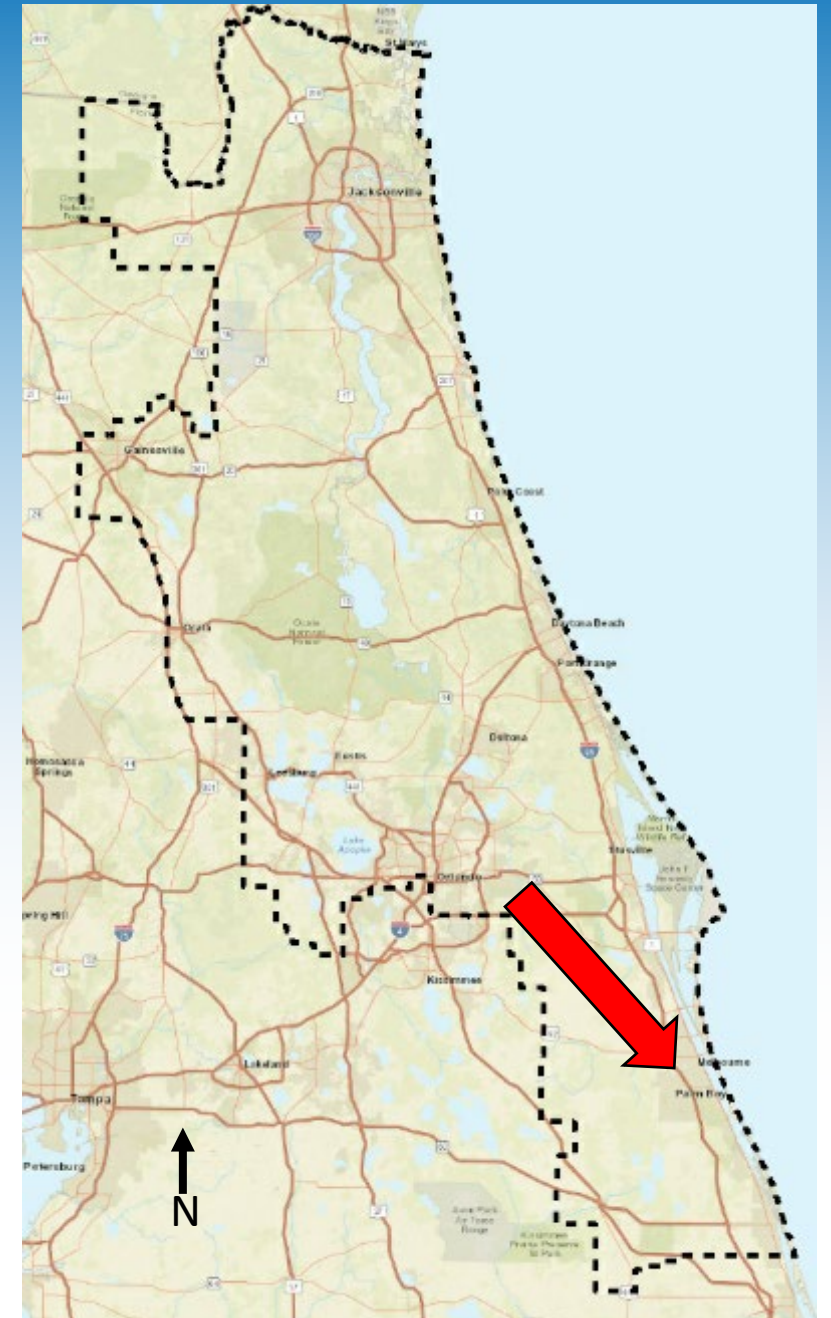
# Indian River Lagoon 2017 Feasibility Analysis

Project Name		Annual Project Cost-Benefit (2016 Dollars)		
		TN Reduction Cost-Benefit (\$/lb TN)	TP Reduction Cost-Benefit (\$/lb TP)	Flow Restoration/ Water Supply Cost-Benefit (\$/kgal)
CERP IRL South		\$483	\$4,000	–
City of Port St. Lucie Water Farming Project*		–	\$200 – \$229	–
SRID Treatment and Storage**	Alt 1	\$100 – \$156	\$900 – \$1,400	–
	Alt 2	\$39 – \$64	\$325 – \$525	–
	Alt 3	\$30 – \$48	\$200 – \$320	–
C-54 and Fellsmere Canals Flow Restoration	Alt 1	\$20 – \$24	\$167 – \$200	\$0.19 – \$0.22
	Alt 2	\$23 – \$27	\$187 – \$227	\$0.21 – \$0.25
Sottile Canal Flow Restoration	Alt 1	\$31 – \$38	\$148 – \$180	\$0.63 – \$0.77
	Alt 2	\$28 – \$31	\$131 – \$148	\$0.56 – \$0.63
Crane Creek/M-1 Canal Flow Restoration	Alt 1	\$22 – \$26	\$172 – \$207	\$0.16 – \$0.19
	Alt 2	\$22 – \$22	\$172 – \$172	\$0.16 – \$0.16
C-1 Canal Baseflow Treatment***	Alt 1	\$33	\$557	–
	Alt 2	\$62 – \$77	\$667 – \$833	–
C-10 Water Management Area		\$61 – \$79	\$1,385 – \$1,769	\$0.62 – \$0.80
Nova Canal Watershed Alternative Water Supply		\$58 – \$76	\$380 – \$500	\$0.43 – \$0.57

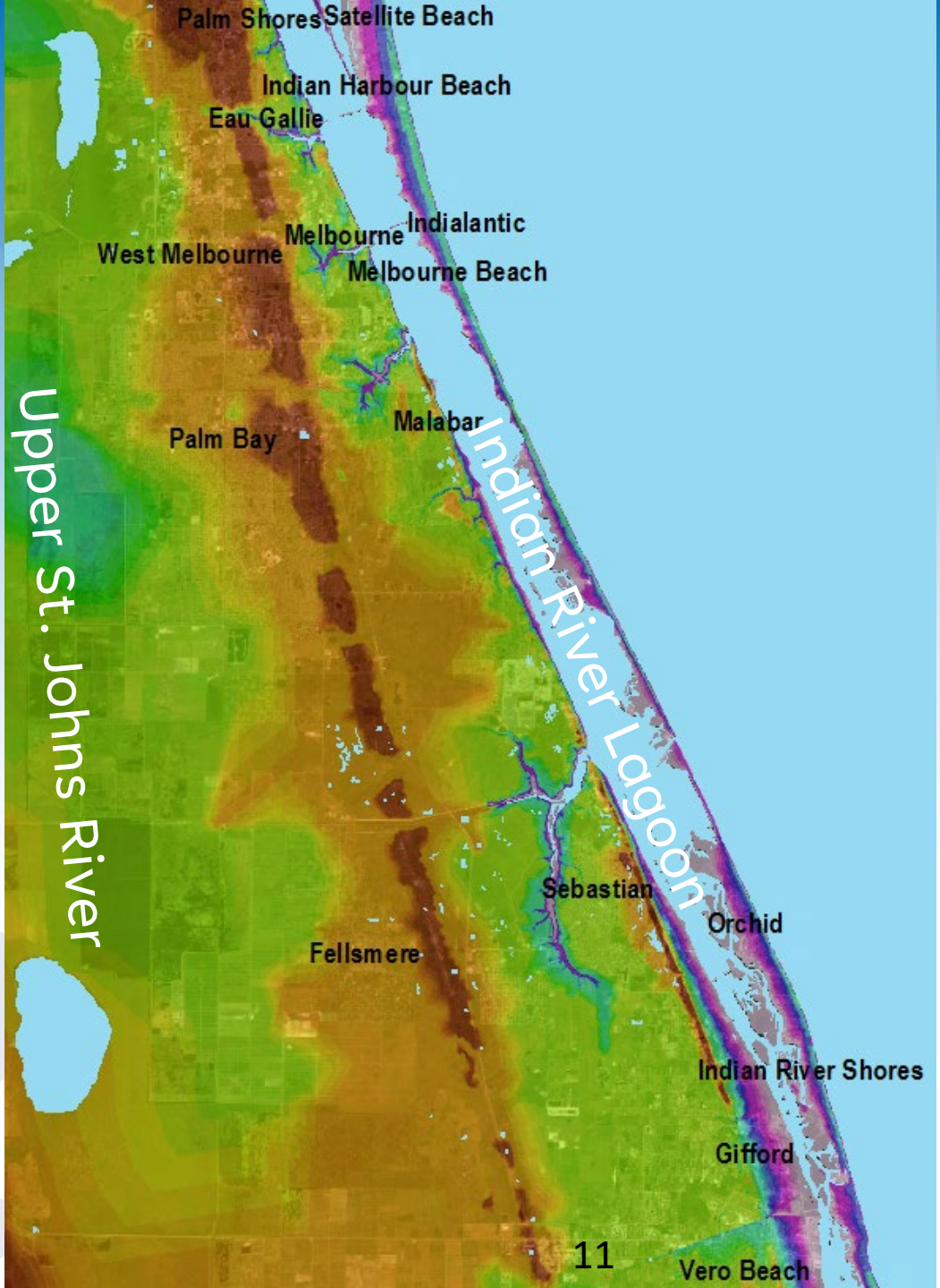


# Crane Creek / M-1 Canal Flow Restoration Project

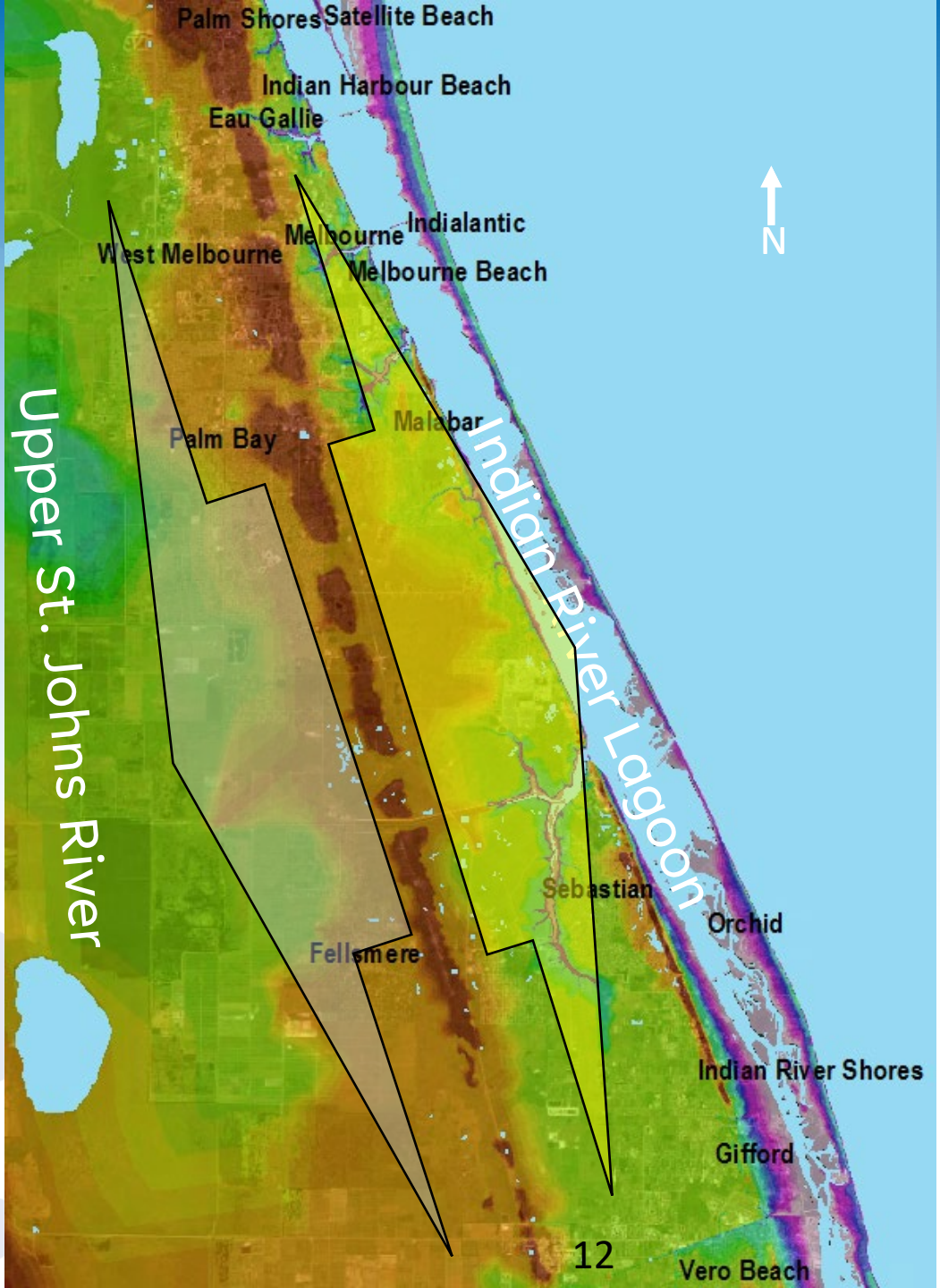
- Restores 5,300 acres of diverted watershed
- Reduce nutrient loading to the Indian River Lagoon
- Conventional system applied at large scale



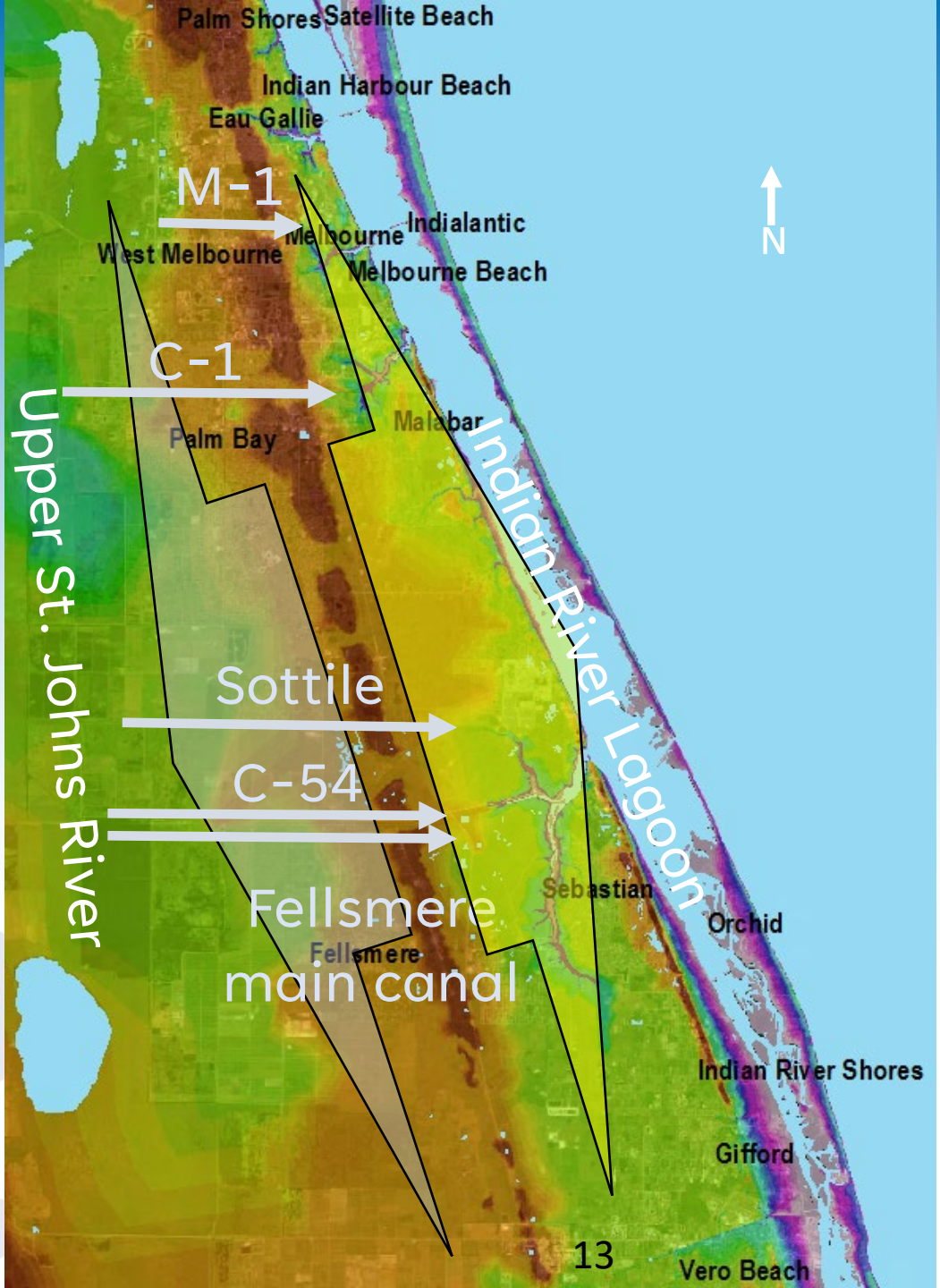
# Defining the Divide



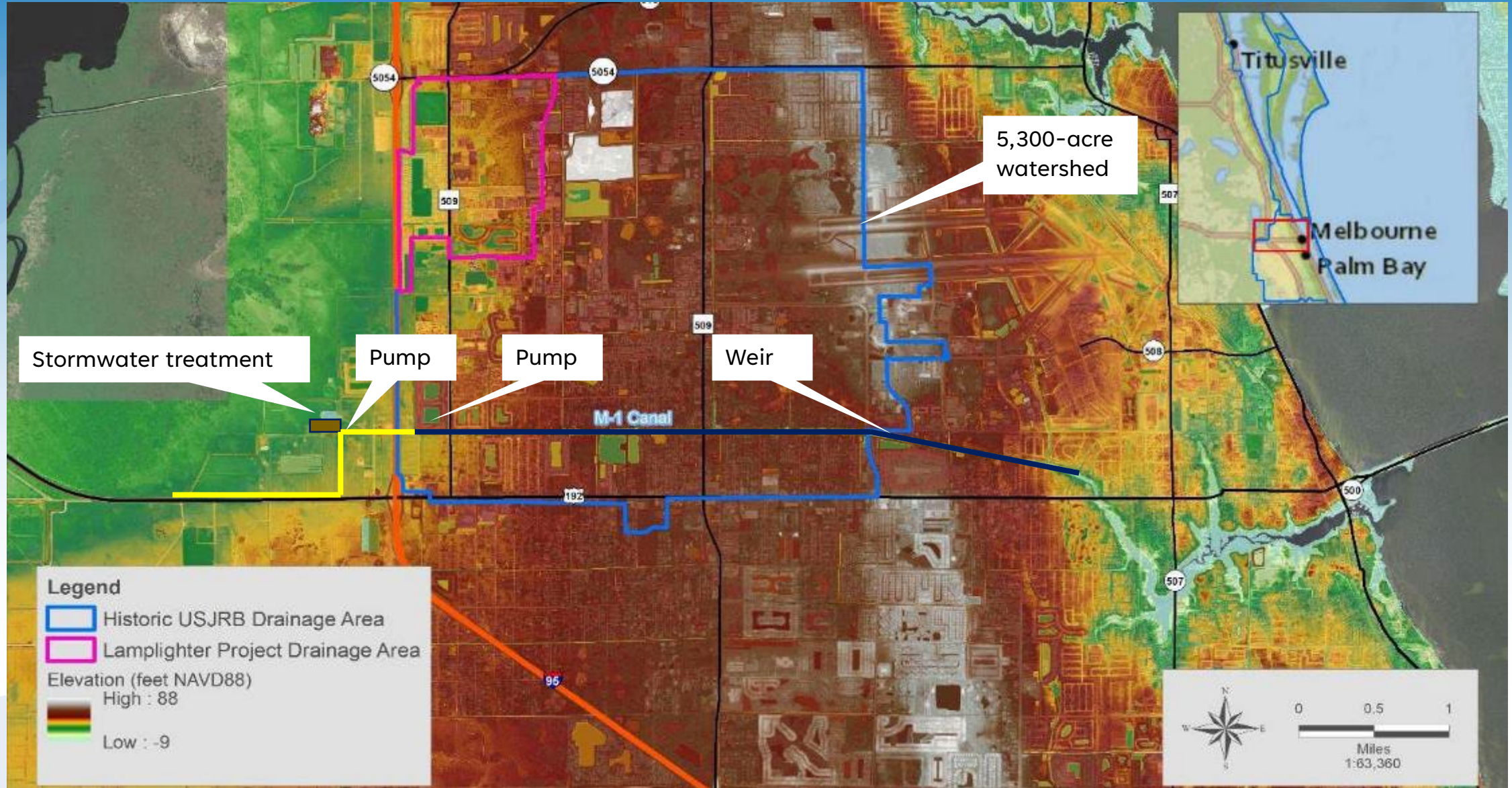
# Defining the Divide



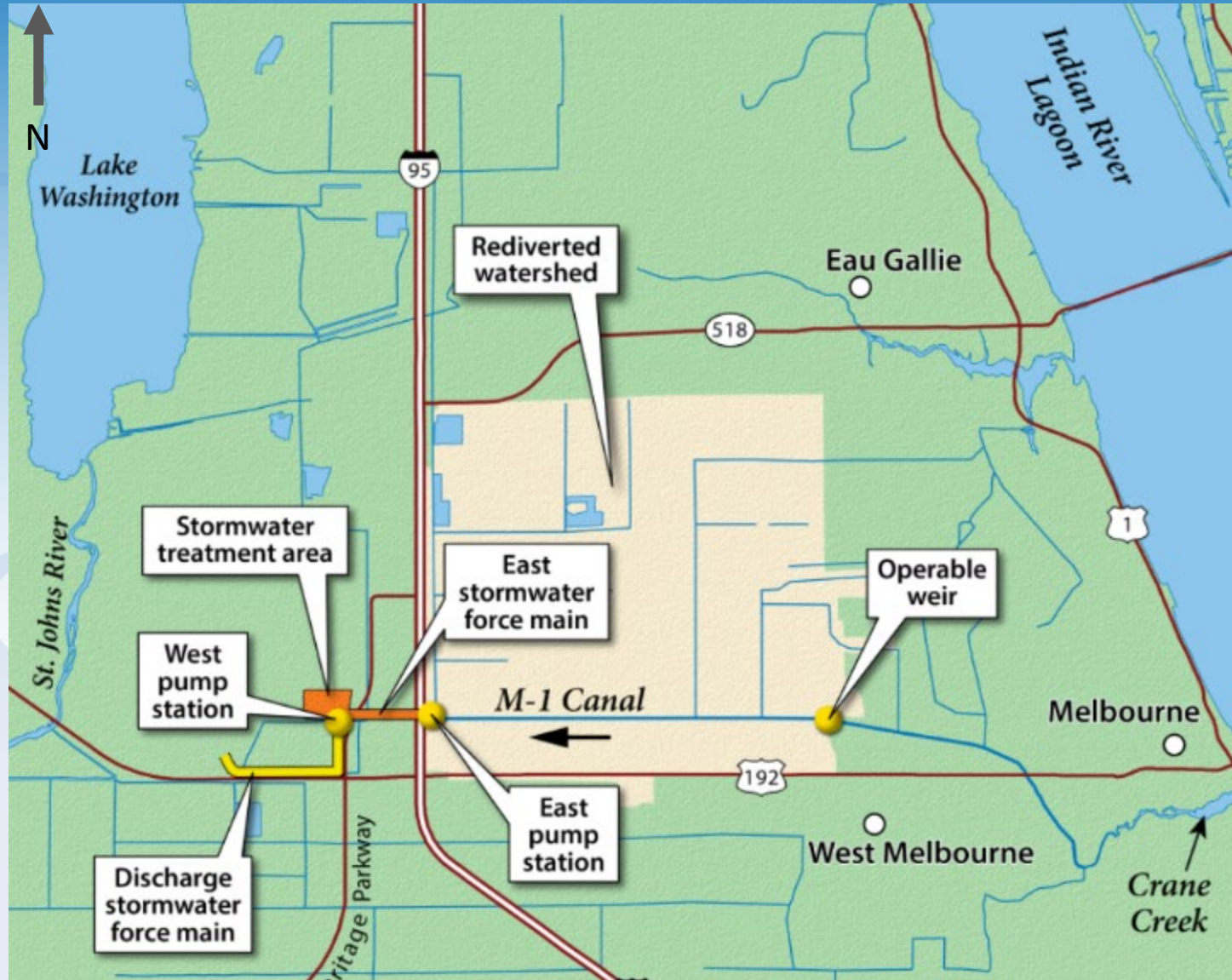
# Defining the Divide



# Crane Creek / M-1 Canal Flow Restoration Project



# Project Overview – Weir/Pump/Treatment



# Project Impact

- **24,000 lb./year** - total nitrogen loading reduced to the IRL
- **3,100 lb./year** - total phosphorous loading reduced to IRL
- **7 MGD** - flow restored to St. Johns River, available for downstream alternative water supply



# Project Cost

- **Cost:**
  - **\$23M** - Includes design and land acquisition
- **Funding partners:**
  - **\$4.5M** - Florida Department of Environmental Protection (Federal AWS):
  - **\$2.9M** - Brevard County SOIRL
  - **\$2.5M** - Florida Department of Environmental Protection
- **O&M Costs**
  - **\$500K** – includes electric, mowing, maintenance



# Adjustable Weir



- Advantages:
  - Passes larger debris
  - Fails in the down position
  - No flood impact

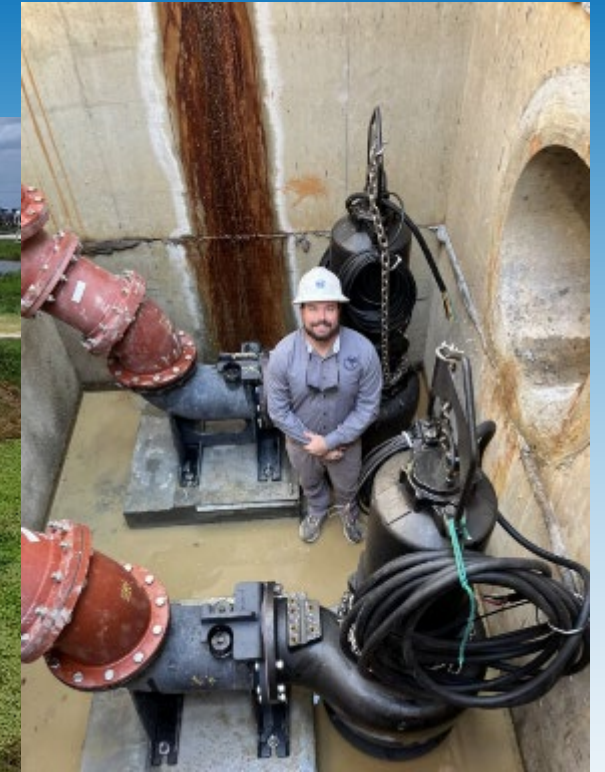


# Weir video



# Pumping Water Through the System

- Moves water from canal to STA, and from STA to the river
- Standard submersible pump stations (40–60 HP)
- Simple, reliable, low maintenance



# Stormwater Treatment Area video



# Discharge Structure

- Located south of US 192
- Discharges into the St. Johns River Marsh
- Removal Efficiency



# Public Support and Regulatory Approval



- Governor recognition
- Public meetings
- Permits



# Questions?

